

Fig. 28. Mandible of *Squilla* sp. (Stomatopodan Crustacea).

Fig. 29. Mandible of *Caprella* sp. (Amphipodan Crustacea).

Fig. 30. Mandible of *Calanus* (Copepodan Crustacea), drawn partly from specimen, partly from figure by Borradaile.

Fig. 31. Left (?) "mandible" of *Peripatus* sp., drawn from several sources.

Fig. 32. Distal region of mandible of isopod crustacean, *Cirolana concharum*. The mandibular palpus is cut off.

Fig. 33. Mandible of ostracod crustacean, *Acanthocypris bicuspis*, from figure by Claus.

Fig. 34. Apical region of mandible of ostracod crustacean, *Cypris pubera*, from figure by Claus.

Fig. 35. Mandible of *Leander serratus* (Decapodan Crustacea).

Fig. 36. Body of mandible of *Ligia* sp. (Isopodan Crustacea).

REVISION OF THE GENUS LIGYROCORIS STÅL (HEMIPTERA, LYGÆIDÆ).

BY H. G. BARBER.

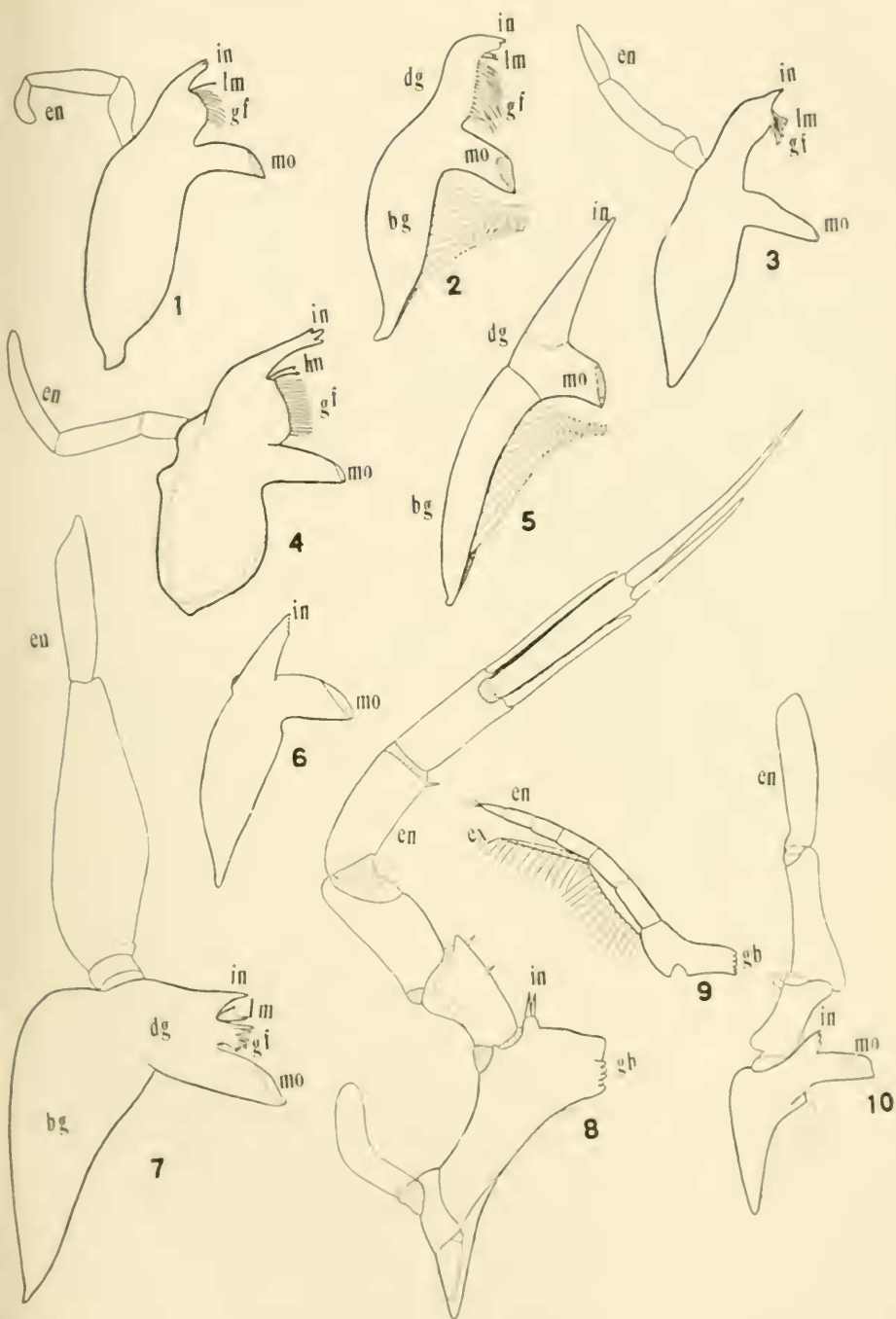
ROSELLE PARK, N. J.

The genus *Ligyrocoris* was founded by Stål in 1872¹ with *Cimer silvestris* L., Fieb. named as type. The author's short diagnosis translated reads: "Disk of the second and third ventral segments furnished on both sides behind the acetabulæ with a denuded, densely and very delicately strigose vitta; first segment of the posterior tarsus doubly or in exotics more than doubly longer than the two apical segments together; anterior femora armed beneath anteriorly with two or three larger and several very minute spines; third segment of the rostrum much longer than the fourth."

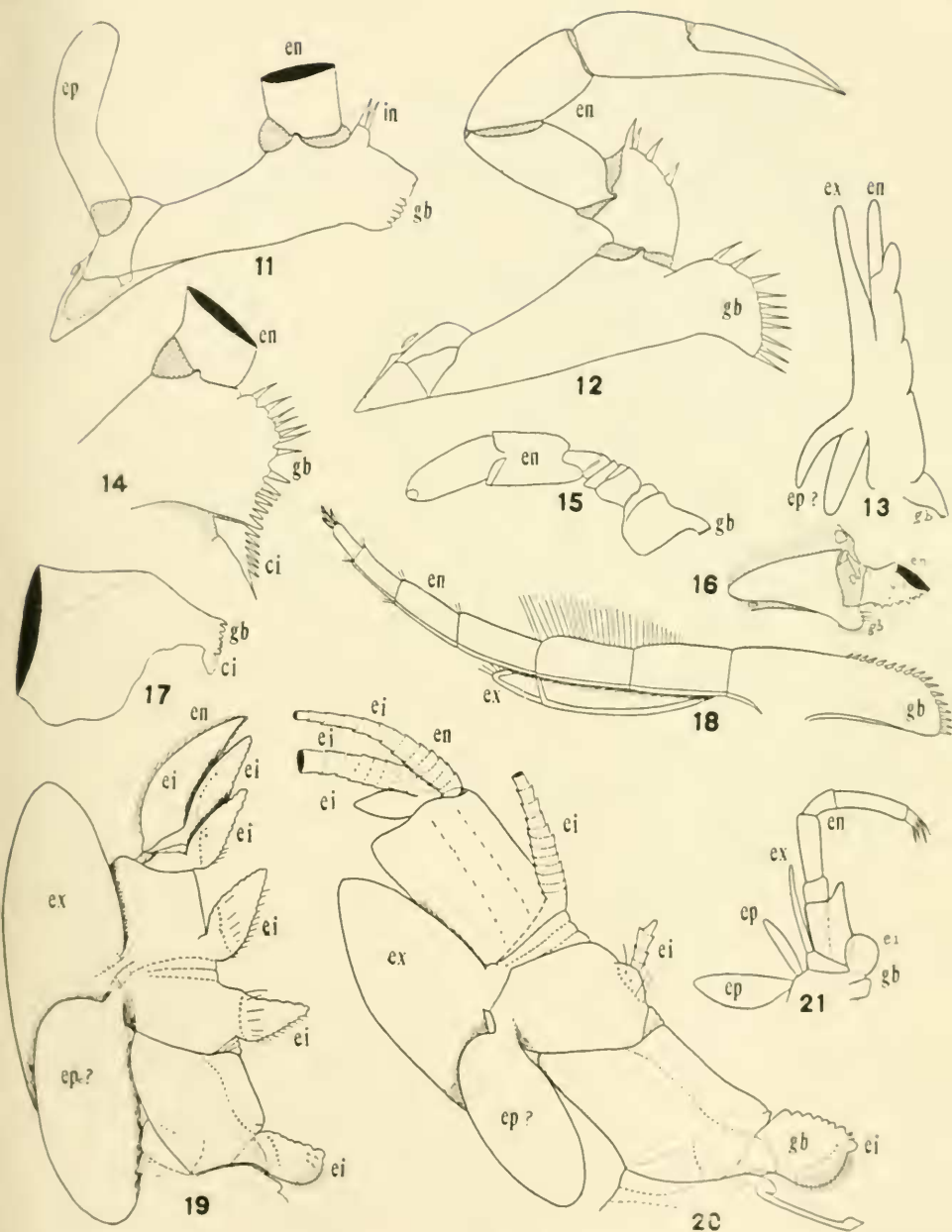
In 1874² Stål in his treatment of the genus as it pertained to America dropped from his diagnostic characters the relative lengths of the third and fourth segments of the rostrum and of the segments of the posterior tarsus. He arranged six species under the genus, as follows: *L. balteatus* and *multispinus* as new species, *Plociomercus sylvestris* Lin., *Plociomera litigiosa* Stål, *Lygæus abdominalis* Guér.

¹ Stål, Of. Vet. Akad. Förh., XXIX, 51, 1872.

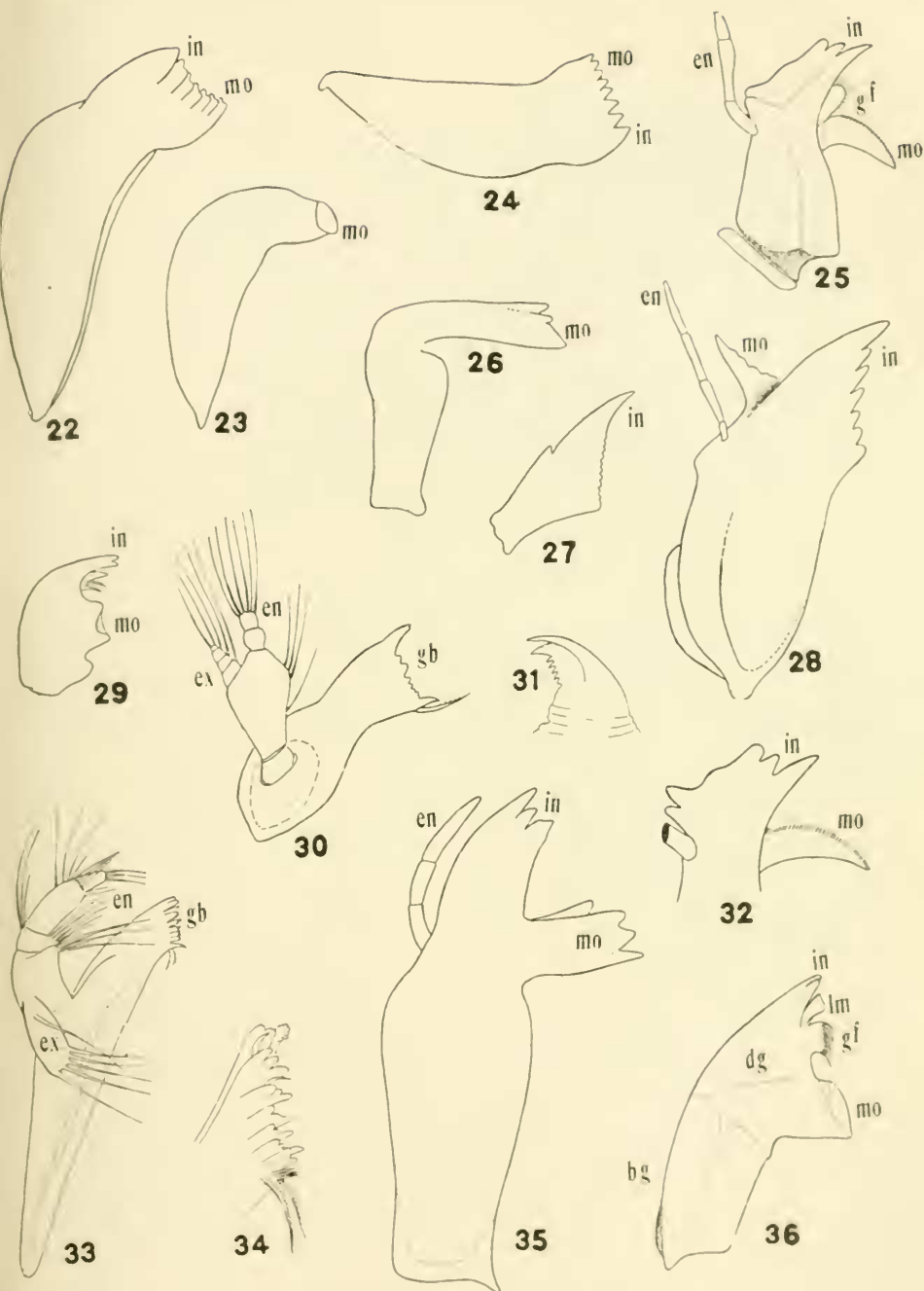
² Stål, Enum. Hem., IV, 144, 145, 1874.



MANDIBLES OF INSECTS.



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and *Pamera constricta* Say, the last named in error. *Plociomerus diffusus* Uhl. and *Pamera contracta* Say were placed as synonyms of *sylvestris* L. which arrangement was accepted by Uhler, until 1908, when Van Duzee³ properly separated *diffusus* as distinct. *L. contracta* is also considered as distinct from the Palearctic *sylvestris* by Van Duzee. As discussed later I cannot concur in this opinion. Since Stal's time the genus has increased somewhat in size by the addition of new species and the transference of others.

The genus *Ligyrocoris* is rather widespread, represented in the Palearctic faunal realm by two species—*sylvestris* in northern Europe and Asia and *terminalis* in Japan, while in the present paper twenty species are shown to occur in the Nearctic-Neotropical realms. While only five species are known from the Northern United States fifteen species are listed from the Upper and Lower Sonoran faunal areas of the United States and Mexico.

KEY TO SPECIES.

1. Head and thorax dull, not shining, most commonly black. Corium with or without post-median fascia. Basal segment of antenna short, much shorter than basal segment of rostrum (subgenus *Ligyrocoris* Stal)...7
- . Head and thorax shining, commonly castaneous. Corium with postmedian fascia and preapical pale spot. Basal segment of antenna long, quite or nearly as long as basal segment of rostrum. Males frequently with tibial tooth (*Neoligyrocoris* n. subg., type, *aurivillianus* Dist.).....2
- 2 Fore tibia of males much curved and armed with a stout median tooth. Terminal segment of antenna with or without pale basal ring.....3
- . Fore tibia of males either straight or curved but unarmed with a median tooth. Terminal segment of antenna not pale ringed at base.....5
3. Terminal segment of antenna pale ringed at base. Anterior lobe of pronotum longer than wide and two or three times as long as posterior lobe. Larger species, over 6 mm. long.....4
- . Terminal segment of antenna not pale ringed at base. Anterior lobe of pronotum slightly wider than long, short, only a little longer than posterior lobe. Tibial tooth nearer apex than base. Smaller species 4 mm. long (Southwest U. S.).....*nitidicollis* Stal.
- 4 Anterior lobe of pronotum never more than twice as long and plainly narrower than posterior lobe. Interocular space narrow, plainly less than twice the diameter of eye. Apex of membrane with a triangular pale spot. Tibial tooth nearer to base than apex. Narrow elongate (Tex.).
aurivillianus Dist

³ Van Duzee, *Canad. Ent., Nl.*, 110, 1908.

- Anterior lobe of pronotum over twice as long and fully as wide as posterior lobe. Interocular space over twice as wide as diameter of eye. Apex of membrane not triangularly pale. Tibial tooth nearer apex than base. Commonly brachypterous (California).....**sobrius** Uhl.
- 5. Anterior and posterior lobe of pronotum nearly equally long, the former plainly wider than long, sparsely setose. Fore tibia nearly straight. Basal segment of posterior tarsus nearly three times as long as second and third segments together. Hind tibia with fine stiff bristles only (Southwest U. S.).....**rubicatus** n. sp.
- Anterior lobe of pronotum longer than wide, nearly twice as long as posterior lobe. Fore tibia plainly curved. Basal segment of posterior tarsus scarcely twice as long as second and third segments together...6
- 6. Dorsal parts, antennæ and legs rather densely setose. Hind tibia provided with numerous long setose hairs between the stiff bristles. Membrane almost entirely pale (Colorado)**coloradensis** n. sp.
- Dorsal parts, antennæ and legs sparsely setose. Hind tibia scarcely setose between the fine bristles. Membrane triangularly pale at apex (Southwest U. S.).....**nitidulus** Uhler.
- 7. Corium outwardly without a postmedian transverse fascia.....8
- Corium outwardly with a postmedian transverse fascia.....11
- 8. Corium with narrow costal margin pale. Fore femora provided only with an inner series of spines.....9
- Corium broadly pale without the median vein. Fore femora with an inner and outer apical series of spines. Ventral lunate vittæ sometimes obscured by coating of fine hairs (Pacific Coast)....**latimarginatus** n. sp.
- 9. Ventral lunate vittæ not obscured by coating of fine hairs. Posterior lobe of pronotum commonly wider than anterior lobe. Antecular distance to apex of antenniferous tubercles nearly equal to postocular space or the former plainly not twice as long as the latter. Membrane either streaked through the middle or much mottled with pale.....10
- Ventral lunate vittæ much obscured by coating of fine hairs. Anterior and posterior lobe of pronotum of nearly equal diameter. Antecular distance to apex of antenniferous tubercles nearly twice as long as postocular space. Outer basal angle and basal veins of the membrane pale (Eastern U. S.).....**obscurus** n. sp.
- 10. Membrane broadly streaked with pale through the middle. Anterior lobe of pronotum scarcely setose, less transverse and plainly longer than posterior lobe. Second segment of antenna nearly two and one half or three times as long as basal (Eastern states).....**depictus** n. sp.
- Membrane spotted with pale. Anterior lobe of pronotum sparsely setose, very transverse, exclusive of collar only slightly longer than posterior lobe. Second segment of antenna about twice as long as basal (Southwest U. S.).....**litigiosus** Stål.
- 11. Terminal segment of antenna pale ringed at base.....12
- Terminal segment of antenna not pale ringed at base.....13

12. Fore femora with only an inner series of spines. Head and pronotum provided with long setose hairs. Second segment of antenna over twice as long as basal segment. Basal segment of posterior tarsus over twice as long as second and third together. Membrane much variegated with pale (Southern U. S.).....**abdominalis** Guer.
- Fore femora with inner series of strong spines and apical outer series of small spines. Head and pronotum with shorter setose hairs. Second segment of antenna about twice as long as basal. Basal segment of posterior tarsus not twice as long as second and third together. Membrane with interior veins pale (Mexico; Florida).....**multispinus** Stål.
13. Eyes not set midway in the head; antecocular distance to apex of antenniferous tubercles longer than or subequal to postocular distance. Anterior lobe of pronotum not narrow, much more than half the diameter of the posterior lobe. Basal segment of antenna short, about one half the length of basal segment of rostrum. Head, pronotum and anterior femora sparsely or scarcely setose. Fore femora armed with a few spines towards apex. Membrane not decolorous.....14
- Eyes set about midway in the head, postocular distance a little longer than antecocular distance to apex of antenniferous tubercles. Anterior lobe of pronotum very narrow, narrower than diameter of head across eyes, nearly one half the diameter of posterior lobe. Basal segment of antenna more than half as long as the basal segment of rostrum. Head, pronotum and anterior femora rather densely long setose. Fore femora armed with a row of strong spines for nearly its entire length. Membrane nearly decolorous (Southwestern U. S.).....**setosus** Stål.
14. Anterior lobe of pronotum piceous, postmedian transverse fascia always well marked. Fore femora armed on the outer half with two or three strong spines, preceding and following the preapical one with two or three fine small teeth.....15
- Anterior lobe of pronotum not piceous, either grayish or partially infuscated. Fascia of corium sometimes reduced or wanting. Fore femora provided with one or two preapical minute spines sometimes reduced to mere tubercles (Southwest U. S.).....**delitus** Distant.
15. Anterior lobe of pronotum and fore femora nearly or quite devoid of setose hairs. Diameter of pronotum at collar subequal to diameter at constriction between the two lobes. Markings of corium fuscous or piceous with the postmedian fascia extended entirely to the edge of the hemielytra. Membrane most commonly not extended to apex of the abdomen, apex triangularly pale (Northern U. S.).....**sylvestris** Linn.
- Anterior lobe of pronotum and fore femora sparsely setose. Diameter of pronotum at collar plainly less than at constriction between the two lobes. Markings of the corium castaneous or ferrugineous with the postmedian fascia generally not quite reaching edge of hemielytra. Membrane commonly produced to end of abdomen, veins for the most part pale (Northern U. S.).....**diffusus** Uhlf.

Ligyrocoris (*Neoligyrocoris*) **nitidicollis** Stål.STÅL. Enum. Hem., IV, 150, 1874 (*Pamera*).BARBER. Bull. A. M. N. H., XXXIII, 514, 1914 (*Ligyrocoris*).VAN DUZEE. Cat. 184, 1917 (*Orthæa*).

This is a small, shining species placed by Stål in the genus *Pamera*. Stål's description of the female only is rather meagre and fails to indicate very common color variations. Though the head, anterior lobe of the pronotum and scutellum as well as the fasciation of the hemielytra may be blackish more commonly these parts with the exception of the scutellum are pale castaneous or ferrugineous; the collar and the posterior lobe of the pronotum pale stramineous, punctate with ferrugineous. The anterior femora and præapical part of second and third femora most frequently are also ferrugineous. Other important characters omitted by Stål are: the head is relatively short, much as in *Heræus*, front much inclined, the eyes so placed that the postocular space is about equal to the space between apex of antenniferous tubercles and eyes; head and pronotum sparsely setose; first three segments of antennæ pale, fourth uniformly darker; membrane slightly embrowned with the apex and some spots toward base pale; fore tibia of males much curved basally and provided with a stout tooth one third the distance from apex; fore femora quite setose and armed almost throughout with a single series of scattered unequal, relatively strong spines, one or two in the middle largest. Length 4 to 4½ mm.

Distribution.—Texas (Stål); Cypress Mills, Tex., Dallas, Tex., Galiuro Mts., Ariz. (Coll. by H. G. Hubbard), "*Ariz.*" (P. R. Uhler Coll.) Coll. of U. S. N. M.; Monterey, N. L., Mexico (Coll. of J. R. de la Torre-Bueno).

Ligyrocoris (*Neoligyrocoris*) **aurivillianus** Distant.

DISTANT. Biol. Cent. Amer. Het., I, 209, Tab. XX, fig. 8. 1882.

(*Pseudopamera*) *pseudohærus* Barber, Bull. Bklyn. Inst. of A. and S., 275, 1906 (*Ligyrocoris*); JOURN. N. Y. ENT. SOC., XXVI, 45, 1918.

After a careful study of Mexican material in the collection of Mr. Torre-Bueno, I am fully convinced that my *pseudohærus* is a synonym of Distant's species, as suggested by me in 1918. In the Brownsville, Texas, material I had only females for study and thus was unaware of the character of the fore tibia of the male. Mr.

Van Duzee is certainly in error in remarking that my *pseudohercus* may not be distinct from *Hercus eximius* Dist.

Distribution.—Mexico (Distant); Brownsville and New Braunfels, Texas (Barber); Pt. Isabel and Brownsville, Tex. (H. S. Barber Coll.), Nueces, Tex. (Marlatt Coll.), Tucson, Ariz. (H. G. Hubbard Coll.) and L. California (P. R. Uhler Coll.) all in the Coll. of U. S. N. M.; San Jose, Tamps, Mexico (Coll. of J. R. de la Torre-Bueno).

***Ligyrocoris* (*Neoligyrocoris*) *sobrius* Uhler.**

UHLER. Proc. Calif. Acad. Sci., Ser. 2, IV, 241, 1894 (*Cnemodus*).

The author described this species only from the more common brachypterous form. Because of the peculiar character of the pronotum and his failure to notice the ventral lunate vittæ he placed it in the genus *Cnemodus*. The macropterous form, of which I have seen only a single male specimen, shows more aptly its *Ligyrocorid* affinity. In this form the species has much the color and appearance of *nitidulus* and *coloradensis*. Uhler's description however contains an error which must have been typographical as in the brachypterous form the pale posterior lobe of the pronotum is a little narrower and in the macropterous form about as wide as the black anterior lobe; the former being at least one third as long as the rather globose, elevated anterior lobe. This species belongs to the group in which the much curved anterior tibia of the males have a median tooth. The fore femora are armed with two series of spines in their apical two thirds, the outer series consisting of five widely separated medium stout teeth, the inner series of about the same number of which one shortly before apex is enlarged.

Distribution.—Lower California and California (Uhler); San Diego Co., Calif. (Van Duzee); Los Angeles Co., Calif. (my Coll.).

***Ligyrocoris* (*Neoligyrocoris*) *rubricatus* new species.**

Shining, very sparsely setose. Anterior lobe of pronotum, except collar, and scutellum black; head and collar ferruginous red; antennæ and legs sordid yellow, the femora spotted with fuscous; the posterior lobe of pronotum, the hemelytra anteriorly sordid yellow with the inner field more or less suffused with fuscous and with a broad postmedian fascia and apex dark brown, before apex with an irregular conspicuous white spot; membrane embrowned with its apex broadly pale.

Antennae rather long, basal segment extended beyond apex of head for less than half its length, second segment one third longer than third, fourth segment only a little shorter than second. Head nearly nude, postocular and anteocular space to apex of antenniferous tubercles nearly equal. Pronotum deeply constricted just behind middle, very sparsely setose, anterior lobe rather globose, a little wider than long, shorter posterior lobe sparsely punctate, sordid yellow, more or less infuscated. The hind femora have a preapical brownish band. The fore tibiae are straight and unarmed in the male. The fore femora are armed with two series of spines towards apex at least, the inner series consists of three stronger spines beyond the middle between which are several smaller spines, the outer series near apex consists of two or three minute teeth.

Length 6 mm.

Type: ♂ Safford, Ariz., July 19, 1914 (E. G. Holt collector, U. S. N. M., from Coll. of W. L. McAtee). Following paratypes: ♀ Bear Wallow, St. Catalina Mts., Ariz., July 12-17, 1916, and ♀ Sabino Basin, St. Catalina Mts., Ariz., July 8-20, 1916 (A. M. N. H.); ♀ Palm Springs, Calif., Feb. 25 (U. S. N. M.); ♀ Huachuca Mts., Ariz., Aug. 3, 1905 (my Coll.).

Ligyrocoris (*Neoligyrocoris*) **coloradensis** new species.

Very closely related to *nitidulus* Uhl. and only distinguishable from that species by comparative differences. Coloration and pattern of markings much the same. Head longer, plainly longer than wide, sides of antenniferous tubercles nearly as long as eye; first segment of antenna longer, apex of tylus not reaching the middle point of it. Pronotum with anterior lobe more swollen and over twice as long as posterior one; seen from the side the former is more elevated; collar wider; dorsal surface more densely pilose. Armature of fore femora and character of the tibia much the same as in *nitidulus*. Transverse fascia of corium not so conspicuous, inwardly and posteriorly fused with apical spot, leaving a small inconspicuous pale spot outwardly. Membrane reaching apex of abdomen generally entirely pale or faintly embrowned within. Length $6\frac{1}{2}$ -7 mm.

Described from five ♂♂ and four ♀♀ collected in northern Colorado April 11, 1898, by E. D. Ball. Type and paratype my collection, 6 paratypes in Coll. Prof. E. D. Ball and 1 paratype in Coll. of Prof. Herbert Osborn.

It is very likely that Van Duzee's record of *nitidulus* from Colorado should be placed here.

Ligyrocoris (*Neoligyrocoris*) **nitidulus** Uhler.

UHLER. No. Amer. Fauna, VII, 262, 1893 (*Pamera*).

BANKS. Cat. Hem. 64, 1910 (*Ligyrocoris*).

In his Check List and various papers Uhler recognized the genus *Ligyrocoris* and it therefore seems strange that he failed to recognize

the true affinity of this species in so much as he remarked in the description of it that the venter of the female has a sickle-shaped callosity running backward from the base. The rather strongly curved anterior tibia of the male is unarmed and the teeth of the fore femora are not set in a single row; the outer series consists of a few shorter teeth before apex, the inner series of several irregular larger teeth, the first one about a third away from base between which and apex are about five or six stout teeth, either one or two near the middle usually being the largest of the series and those before apex reduced in size.

Distribution.—Argus Mts., Calif., Texas, New Mexico, and Lower California (Uhler); Colorado [?] and Arizona (Van Duzee); Huachuca Mts., Ariz., Burnet Co., Tex. (my collection); "Tex.", Ft. Grant, Ariz., San Rita Mts., Ariz., Galiuro Mts., Ariz., Bradsh. Mt., Ariz., Chiric Mts., Ariz. (U. S. N. M.).

Ligyrocoris latimarginatus new species.

Dull, very sparsely setose. Head black, sparingly setose, tylus red. Antennæ pale stramineous, apex of second, third and fourth except at base, fuscous, apical third of basal segment extended beyond apex of head, second segment longest of all, third and fourth segments subequal. Rostrum, except at apex, pale stramineous, basal segment a little longer than basal segment of antennæ, its apex nearly reaching base of head. Anterior lobe of pronotum dull black, sparsely setose, very little wider than long, not twice as long as posterior lobe; posterior lobe of pronotum infuscated, with humeral margins and three obscure discal streaks paler, rather finely and not closely punctate. Scutellum black with apex pale. Hemelytra anteriorly and laterally to median vein broadly pale stramineous, punctate with fuscous; clavus posteriorly, inner apical angle broadly and entire apical margin narrowly fuscous. Membrane fuscous variegated with pale spots. Legs pale stramineous, with the fore femora mottled or smudged with brown and the apices of the second and third femora infuscated. Fore femora provided on the outer half with three widely separated larger spines, preceding and following the preapical one are several smaller teeth. Tibia with stiff bristles only. Basal segment of posterior tarsus very long, three times as long as second and third segments together. Sternum and venter black, acetabule and posterior margin of metasternum pale.

Length, ♂ 7 mm.; ♀ 8 mm.

Type, ♂, and allotype, Alameda Co., Calif., Sept. 20, 1900, coll. by Chas. Fiebs.; paratypes: 2 ♂♂ "Calif.," ♂ "W. T.," ♂ Umatilla, Oregon, June 24, 1882; 2 ♀♀ Sta. Monica, Calif., June 6, 1901 (Coll. U. S. Nat. Mus.); ♀ Mt. Shasta, Calif. (my coll. from C. E. Olsen).

This species is readily distinguished by the entire absence of the post-median fascia of the corium. Occasionally the ventral lunate vittæ are somewhat obscured by the dense coating of fine hairs. It should be placed close to *litigiosus*.

Ligyrocoris obscurus new species.

Form rather narrow elongate, dull, sparsely setose; very closely resembling *Zeridoneus* (*Perigenes*) *costalis* Van Duzee. Head black, sparsely long setose, with coating of fine impressed golden yellow hairs; apex of tylus reddish. Antennæ long, stramineous, extreme base of first, apex of second lightly, apical half of third and all of fourth segment, fuscous; apical half of basal segment extending beyond apex of head, second segment two and one half times as long as first, third about one third shorter than second and subequal to terminal segment. Pronotum dull black, sparsely setose, with the transverse constriction shallowly, obtusely impressed, anterior lobe a little wider than long; posterior lobe little wider and except for humeral angles scarcely paler than anterior lobe, rather closely and finely punctate; lateral margin from the humeral angles stramineous. Scutellum black, apex pale, posteriorly keeled, closely punctate along the sides. Hemelytra infuscated, entire costal margin, a streak outside of claval suture opposite apex of scutellum and a spot near inner apical angle, stramineous-yellow. Membrane fuscous with some of the veins basally and a few scattered spots, pale. Beneath piceous, the venter densely coated with fine golden lunate vittæ. Legs stramineous-yellow, fore femora from about middle towards apex, hind femora apically, intermediate femora more faintly and apices of all tibiæ infuscated. Fore femora armed on the outer half with two series of spines, the inner series consists of three larger spines, the first two just beyond the middle are set closer together, and the third midway to apex, before and beyond the latter are some three or four very small teeth; the outer series consists of three or four minute teeth towards apex. The hind tibia are provided with some 11 bristles in each side and the basal segment of the hind tarsus is a little over twice as long as second and third together.

Length, ♂ $7\frac{1}{2}$ mm.; ♀ $8\frac{1}{2}$ mm.

Type: ♂ Plummers Is., Md., Feb. 8, 1905, collected by D. H. Clemons (U. S. N. M.). Paratypes: 2 ♂♂ and 2 ♀♀ Plummers Is., Md.; ♀ Cabin John, Md., Feb. 9, 1914; ♀ Ogle Co., Ill. (U. S. N. M.); 2 ♂♂ Plummers Is., Md. (from O. Heidemann); ♂ Kansas; ♀ Cabin John Run, Md., Sept. 23, 1911, collected by Wm. T. Davis (my collection); ♂ Plummers Is., Md., Sept. 21; ♀ Cabin John, Md., Sept. 2, 1907; ♀ Glen Echo, Md., Oct. 12, 1901, from the collection of Mr. O. Heidemann (Cornell Univ.).

Very similar in appearance to *Zeridoneus* (*Perigenes*) *costalis* Van Duzee which species shows no trace of the lunate strigose vittæ. Furthermore in *L. costalis* the antennæ are shorter with the first